Interreg
EUROPEAN UNION
North-West Europe
HeatNet NWE
European Regional Development Fund

District Heating in North-West Europe

A Guide for Energy Consumers

Who is this guide for?

This guide is meant to provide guidance on the subject of 4th Generation District Heating and Cooling (4DHC). It is addressed to energy consumers, not only households but also service and business companies.

It is not meant to be an exhaustive overview of 4DHC. Nonetheless, it can be used as a medium to ease discussions between actors taking part in such projects, especially private energy consumers, property unions and building owners or managers.

More detailed guides are available from the HeatNet NWE project. Please visit **www.guidetodistrictheating.eu** for more information.

What is District Heating and Cooling?

District Heating and Cooling (DHC) is a network that delivers heat or cold from one or more centralized production units to a set of buildings, through a network of pipes.

The **energy centre(s)** consist of production units, preferably from renewable and local energy sources. They produce the energy necessary to run the network. They also guarantee the temperature of the water running through the pipes all the way to the end-users. The diversification of energy sources diminishes the risk of interruption of the production, and the use of renewable energy sources guarantees a stable price of energy. A number of different energy sources can be implemented in DHC: biomass, geothermal, solar, energy retrieved from data centres or energy recovered from waste-to-energy plants.

The **network of insulated pipes**, usually buried in the ground, consists of double pipes. One distributes hot water from the energy centre to the delivery point and the other ensures its return. These pipes are insulated, thus reducing the heat losses on the way, and securing the temperature of the water.

Finally, in each building, or set of buildings, within the **substation**, the water coming from the energy centre transfers its energy to the building's heating or cooling devices, through the heat exchanger. The substation represents the distinction between the primary network (the DHC network) and the secondary network (that of the building).

Current Situation

With 10,000 networks all over Europe, about 8% of the total heat demand is covered by district heating. Yet there is a big disparity between countries regarding the share of inhabitants served by district heating.

On the one hand, in countries in Eastern and Northern Europe, such as Latvia, Denmark, Poland and Sweden, district heating distributes energy to more than 60 percent of the population.

On the other hand, in North West Europe, that is, in Ireland, United Kingdom, Netherlands, France and Belgium, this share falls below 10 percent.

However, district heating and cooling has many advantages for energy consumers, be they in the residential or tertiary sector.

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Benefits for Consumers

Social benefits

- Reduced fuel poverty
- Improved comfort
- Greater security of supply
- Job creation

Economic benefits

- Affordable energy, lower maintenance bills
- Energy at a stable price, freed from fossil fuels and international markets

Environmental benefits

- 4DHC networks are mostly fuelled by renewable and local energies such as biomass, geothermal, and solar energy, therefore reducing the carbon emissions of the energy production

Technical benefits

- Due to the absence of boilers and fuel storage, any risk of fire, explosion and carbon monoxide leak is eliminated

Technical considerations

District Heating and Cooling can be used as a heating or cooling solution for every type of building: commercial, business, housing, renovated or freshly-built. DHC networks are able to provide heat or cooling to many different types of buildings, while still ensuring the comfort of the end-users and security of supply. However, the connection of a building is always assessed through its feasibility.

The feasibility of connecting a building to the network depends on different conditions: the type of heating devices in the building, the technical constraints inherent to the DH network, as well as the technical area where a substation could potentially be located, and the distance between the DH network and the building. The connection of a building to a DHC network is possible via the substation. It allows the transfer of the energy (heat or cold) from the pipes in the underground network (which is called the primary network) to the pipes circulating in the building (which is called the secondary network). This is possible thanks to the heat exchanger. Associated with the heat exchanger is an ensemble of security, control, regulation, communication and metering equipment.

Finally, the energy in the pipes in the building will allow heat to be distributed to the units of the building (apartments, businesses, etc.). The end-user has complete control over the amount of energy that is distributed in their unit, thanks to the installation of regulation devices (thermostatic radiator valves, thermostats or smart thermostats).

Economic considerations

The investment necessary to connect the building is another important decision parameter. This investment cost depends on the current heating devices installed in the building, the connection fee (this depends highly on the network), and the amount of refurbishment / adaptation works that have to be done to the building.

- Current heating devices installed: for example, with electric heating, the investments will be great because of the need to install water pipework;

- Connection fee: it depends highly on the network: for some freshly-built networks, this can be free, because it secures the consumption, ensuring the safety of the project. For others, it depends on the nominal power of the heat exchanger and the distance between the network and the building;

- Adaptation / refurbishment: it is more relevant to undertake refurbishment works before any connection to a district heating network; thus, the heat exchanger is sized according to the renovated building.

The network operator does not support these investments; it is the owner of the building, condominium, and, in the end, the end user.

Across North West Europe, a number of incentives and subsidies exist to encourage the use of district heating and cooling in all sectors (public, residential and commercial). Some of the existing subsidies in NWE, as of 2019, include:

- In Flanders, the Renovatie Pact offers federal subsidies in the form of energy premiums, loans and programs dedicated to vulnerable target groups.

- In France, there is a reduced VAT for the energy consumers (from 20% to 5.5%), which directly effects the energy bill. While some incentives promoted by the government concern the refurbishment of buildings, such as the zero-interest loan Eco-PTZ, another subsidy covers the fees for the connection of a building to a District Heating network. It is the Tax Credit for Energy Transition.

- In the Netherlands, the Heat Act aims to protect the consumers (with a connection of less than 100 kW). The regulating body, the ACM, sets the tariffs for heat of such consumers, with the principle that the costs for a household connected to District Heating should not be higher than those of a household with a condensing gas boiler.

- In Wallonia, the UREBA subsidies are dedicated to some public entities and commercial bodies to improve the energy efficiency and the use of energy in the buildings. This can cover a number of different works, including the implementation and extension of a heat network.

Billing

Contrary to gas or electricity prices, which are submitted to national regulations, district heating and cooling networks are unique projects. Thus, the energy prices from one network to another changes depending on different characteristics.

What are the DHC expenses for?

- Fuel purchasing (biomass, gas) or heat purchasing directly to a third-party (waste heat);

- Operation and maintenance costs: staff to operate the energy centres, electricity for the operation of the auxiliary equipment, renewal of defective parts, etc.;

- The purchase of equipment (boilers, energy centres, and pipework), equipment maintenance and renewal costs.

Depending on the administration mode of the network, the operator can grant himself profit on the heat and cold sale.

The bill, sent to the contract subscribers, covers the expenses described above. It is usually divided between a variable part (R1) and a fixed part (R2). The variable part, R1, covers the fuel and waste heat purchase. It is the product of the energy consumption and the heat price (€/MWh).

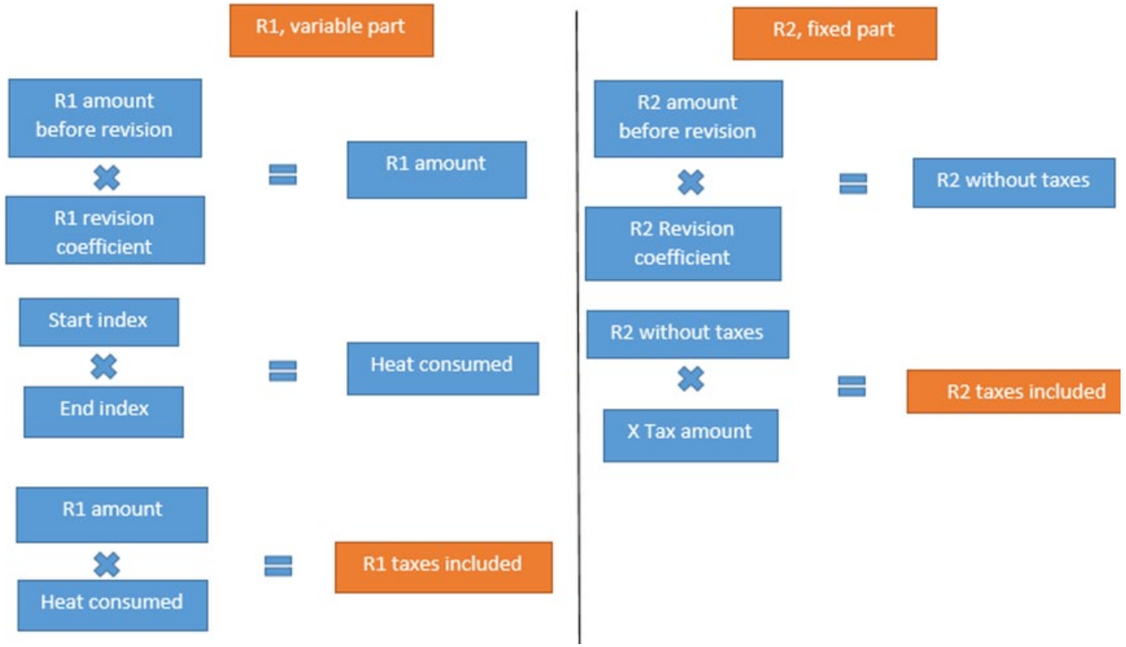
The fixed part, R2, covers the depreciation of investments, the operation and maintenance costs and big maintenance and renewal. It is the product of these charges and the power subscribed at the substation (€/MW). The fixed part can represent up to 70% of the bill.

Price to the end-user

In the case of DHC, where large buildings are connected, the contract subscriber can be different from the end-user. The network operator passes the bill to the contract subscriber; the amount of this bill is set according to the metering operated at the substation. If the building(s) considered consists of different units, the contract subscriber allocates the bill to the different users. The amount of this bill is set on the metering operated at each delivery point.

The European Energy Efficiency Directive of 2012 made energy metering at each delivery point compulsory. This allows energy consumers to pay and access the real amount of their energy consumption, rather than paying for a share of the total energy consumption at the building level.

Individual metering and billing is a great step towards the empowerment of energy consumers, as it enhances the energy savings performed by the users.



Source: Fedene

What are the actors of district energy and how are their roles distributed?

Public bodies and operators

DHC networks are often the result of the initiative of a local public authority. While this public body is responsible for the proper running of the network, it can devolve part of its responsibilities to an operator. This includes a contract that binds the operator to a level of performance, or an energy price.

Building managers

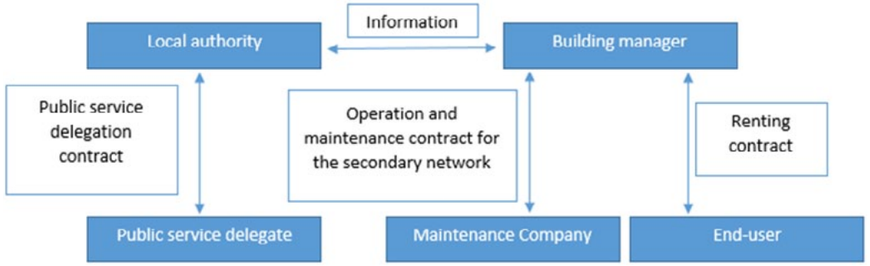
In DHC schemes, collective housing represents the biggest part of the buildings connected to the network. The property owner or the condominium manages these buildings; they represent the direct clients of the network. The building manager pays the energy bill to the network operator, and collects the due amount via the rents or charges.

In the case where the end-user is the building manager (e.g. hospitals, some public or business buildings), the client is also the end-user.

Additionally, the building manager enters into a service contract for the maintenance and performance of the building heating or cooling equipment, with a specialised company. This maintenance consists in ensuring the safety of the installation and the quality of the water running in the pipes: treatment, filtration, sludge removal and fight against legionella bacteria. This maintenance is the responsibility of the building owner or manager, but it is important for the overall performance of the network.

End-users

The end-users benefit from the heat supplying service, and so pay the heating charges to the building owner or manager. In case a problem in the heat supply is noted, the end-user would report the issues to the building manager.



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Consumer involvement

District energy – heating and cooling – is a very reliable energy source due to its use of different energy sources. Thus, consumers can expect a very high quality level of the heat supplied. Even more, national initiatives seek to provide clear pathways and outputs so that heat networks are effectively operated and meet expectations, such as the Heat Networks code of practice in the United Kingdom.

Some projects tend to integrate the inhabitants in its early stages. For instance, a consultation meeting allows the project to be presented to the inhabitants, and in return, to take into account any worries they may have. This can avoid further disagreements and tension between all actors.

For example, in France, towns with a population above 10,000 inhabitants must implement a Local Public Services Advisory Board (CCSPL, Commission Consultative des Services Publics Locaux). This board is mandated to gather the advice of the citizens when a public service delegation is being created; thus, it is consulted when a public district heating or cooling network is being planned.

During the operation of the network, network operators often create websites dedicated to the network. The information provided typically includes the predicted works on the network, the foreseen evolutions, the consumption of each consumer via a dedicated space, a newsletter concerning the transparency and surveillance of the network.

Consumer protection

France

The national committee for district heating actors gathers network operators, professionals, and representatives of local authorities and end-users. It seeks to improve the relations between all district heating actors, and emphasise good practices for local district heating schemes.

Three representatives of end-users are part of the committee: the Association of Condominium Managers (ARC, Association des Responsables de Copropriétés), the National Housing Confederation (CNL, Confédération Nationale du Logement), and the Trade Union Confederation of Families (CSF, Confédération Syndicale des Familles). These associations and confederations work for the defence of consumers, tenants, families and condominiums.

In cooperation with the other members of the committee, they have worked on different proposals aimed to improve the relations between local authorities, operators, managers and end-users.

The proposals can be gathered around three improvement areas: the readability of energy costs, the increase of end-user consultation, and easy access to data concerning the energy delivery service.

United Kingdom

In the UK, the Heat Trust, managed by Heat Customer Protection Ltd, is a not-for-profit trust at the service of consumers. Facing an unregulated market in the United Kingdom regarding heat networks, the Heat Trust aims to protect the consumers by setting a standard quality level of services.

If a heat network is registered with the Heat Trust, the heat customers will benefit from standards set out by the heat trust scheme.

These standards, designed to be comparable with those of the gas and electricity companies, include support for consumers in vulnerable circumstances, response to faults and emergencies, guaranteed service payments for interruptions in supply, metering and billing, and complains handling.

The Heat Trust's website grants access to all the heat suppliers and heat networks that are registered.

Ireland

In Ireland, although no association is dedicated to district heating, one may find resources from the Consumer Association of Ireland, and the Irish Property Owners Association.

Netherlands

The Heat Act sets regulations for heat networks; according to this Act, the Authority for Consumers and Markets (ACM) acts as a regulating body and sets the tariffs for heat, covering small-scale users (connection inferior to 100 kilowatts, business or consumer). The Heat Act aims to protect consumers against too-high prices. Therefore, the ACM has set three tariffs: maximum price for supplying heat, maximum tariff for connection and maximum tariff for metering. These tariffs are based on the principle that a consumer connected to a heat network should not pay more than one connected to the gas network ('No more than otherwise').

Belgium

In Wallonia, the federal government is mandated to define maximum prices and consumer rights relating to heat networks. Resources can be found on the Service Public of Wallonia's website (www.energie.wallonie.be).

In Flanders, the Federal Public Service on Economy (FPS Economy) provides useful information regarding consumer rights, and the management of complaints, with a dedicated mediation service.

Further information

This guide has been developed as part of the HeatNet NWE project, which is part-funded through the Interreg NWE programme and aims to increase the uptake of 4DHC networks across North-West Europe. As part of this project, the partners have developed the HeatNet Model, which helps the public sector to begin implementing 4DHC networks, and the Transition Roadmaps, which outline the partners' experiences in developing six district heating pilots across North-West Europe. The HeatNet Guide to Financing 4DHC is also available and gives a broad overview of the various sources available to finance district heating schemes.

For further information on these reports and on the HeatNet NWE project, please visit: **www.guidetodistrictheating.eu**.

If you are interested in district heating projects and would like further information, please contact your local contact point within the HeatNet NWE project (see individual contact details on the next page).

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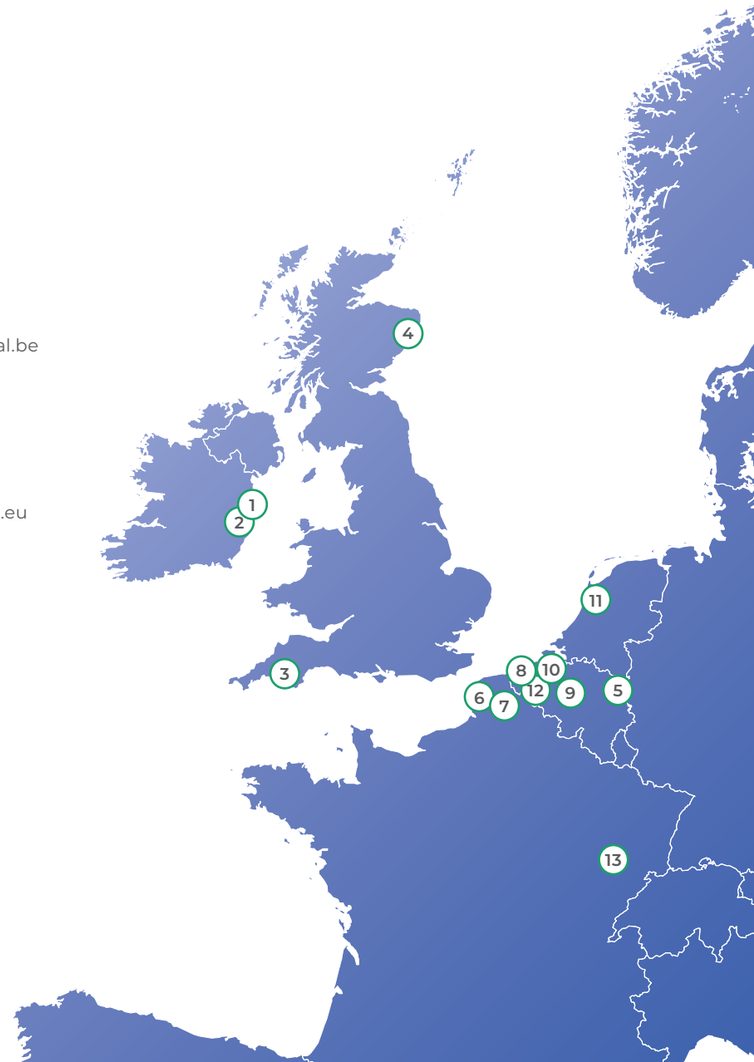

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